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File Code: 3420 **Date:** October 24, 2005
Route To:

Subject: Spruce Beetle at Snowbowl Ski Area (peaksrd)

To: District Ranger, Peaks RD, Coconino NF

We (Arizona Zone of Forest Health Protection) have been working with your staff silviculturist, Jim Rolf, regarding spruce beetle, *Dendroctonus rufipennis*, activity and suppression treatments at the Snowbowl Ski Area over the last five years. This letter summarizes the results of suppression treatments and observations regarding spruce beetle activity in this area. We provide a background of spruce beetle activity, a description of past and present suppression actions, and a discussion of possible future actions.

Background

In the fall of 1999, a windstorm caused damage to spruce-fir stands on the San Francisco Peaks. The majority of this damage was in the form of causing spruce trees to blow over and was primarily spread across 25 acres within the Snowbowl Ski permit area. Spruce beetle is well known to infest trees that have been blown over. Surveys in 2000 and 2001 indicated spruce beetle activity had occurred in essentially all the wind-thrown spruce.

A survey in the fall of 2001 found several standing infested spruce. A total of 161 infested spruce trees were tallied within the blowdown area adjacent to the chairlift below Midway. These findings indicated that some of the brood developed and emerged within a one-year time span. At this time, most of the infested trees were limited to within the areas of blowdown; that is, beetles had not yet expanded to adjacent stands.

Based on walk-through surveys, stands adjacent to blowdown area seemed to be at moderate-high to high risk. There are numerous spruce trees greater than 16 inches diameter at breast height, and spruce composition and basal areas are high. This combination of stand characteristics and increasing beetle populations indicated that an outbreak was likely.

Past suppression efforts and current situation

In 2001, the Peaks RD contracted with the Coconino Rural Environment Corps (CREC) [formerly called Northern Arizona Conservation Corps (NACC)] to begin treating infested blowdown by limbing, bucking, and scorching the outer bark with torches. Due to the narrow window of favorable weather to complete this treatment, only a small percentage of the blowdown was treated.

More than 700 infested spruce trees and new areas of blowdown were identified in late summer of 2002. In addition to surveying within the permit area, we ran a two-chain wide survey in the Kachina Wilderness adjacent to the Upper Ridge ski run (W1 in ***Figure 1***). Only 8 infested spruce trees were found in approximately 8 acres surveyed, indicating that most of the infestation

was limited to the permit area. In 2002, the District contracted CREC to treat standing infested trees by felling and peeling through the use of a "log wizard." Removing the bark results in the developing brood to desiccate and die. The use of a log wizard permits a wider window of opportunity for treatment compared with burning. However, because the District did not receive funds until mid-April, chainsaw restrictions and then forest closures, this treatment did not begin until August and only approximately 150 trees were felled and peeled. Forested areas C, E, F, and G were partially or completely treated.

In 2003, the Peaks RD also contracted CREC to treat standing infested trees by felling and peeling through the use of a "log wizard". From July through September, approximately 330 trees were felled and peeled. Forested areas A, C, and F were partially or completely treated. Funding delays and chainsaw restrictions due to fire risk prevented the felling and peeling treatments from starting until late July, and weather delays prevented the completion of treatments. In addition, infested trees adjacent to the Agassiz Chair Lift were not felled and peeled because of their potential hazard to the lift. Thus, some spruce beetle emerged from previously infested trees before treatments took place, and not all infested trees were treated. In August 2003, personnel from our office identified 289 newly infested spruce trees within forest areas A, C, and F. Limited resources and time prevented other areas from being surveyed at that time. In addition to the felling and peeling treatment, the anti-aggregation pheromone for spruce beetle, MCH, was deployed on approximately 50 acres of forested area within forested areas A, B, C, H, and W1 during the summer of 2003. The use of these pheromone treatments reduced new attacks within area A by nearly 75 percent. In other areas treated with MCH there were similar reductions in the number of newly infested trees.

In 2004, the Peaks RD again contracted CREC to create trap trees, to treat standing infested trees by felling and peeling, and to deploy MCH bubble capsules. Because infested trees near the chairlift were not felled and because several factors have prevented infested trees from being treated prior to beetle emergence in past years, this additional treatment of using trap trees was implemented. Trap trees are uninfested trees with a dbh greater than 12 inches that are felled before beetle flight initiates in the early summer (Holsten *et al*., 1999). Trap trees can absorb up to 10 times the number of spruce beetles that a standing tree will absorb and can help to suppress increasing spruce beetle populations (Bentz and Munson, 2000). In May 2004, 12 clusters of five trap trees (60 trap trees in total) were created by selecting uninfested spruce trees within in designated areas. A total of 60 trap trees plus 87 current infested trees were felled and peeled in forested areas A (only 5 of 18 trees treated), C, F, G and I, and an additional 18 trees were felled and peeled along the Agassiz Chair Lift with the assistance of Arizona Snowbowl staff. In addition, all stumps were peeled as they can harbor large numbers of spruce beetle. The combination of treatments reduced new attacks within forested areas by approximately 75 percent and the spruce beetle population as a whole appeared to be diminished within the Arizona Snowbowl permit area.

In 2005, similar treatments were implemented using the CREC crew; however, instead of using trap trees, Lindgren funnel traps (Lindgren 1983) were placed within forested islands F, G, and I. These traps were used to monitor the timing of spruce beetle flight. Some limited amount of spillover occurred near the traps and these trees were identified, felled, and peeled in September 2005. A total of 51 beetle-infested spruce trees were treated by peeling of which only eight trees were new attacks within the approximate 50 acres treated with MCH.

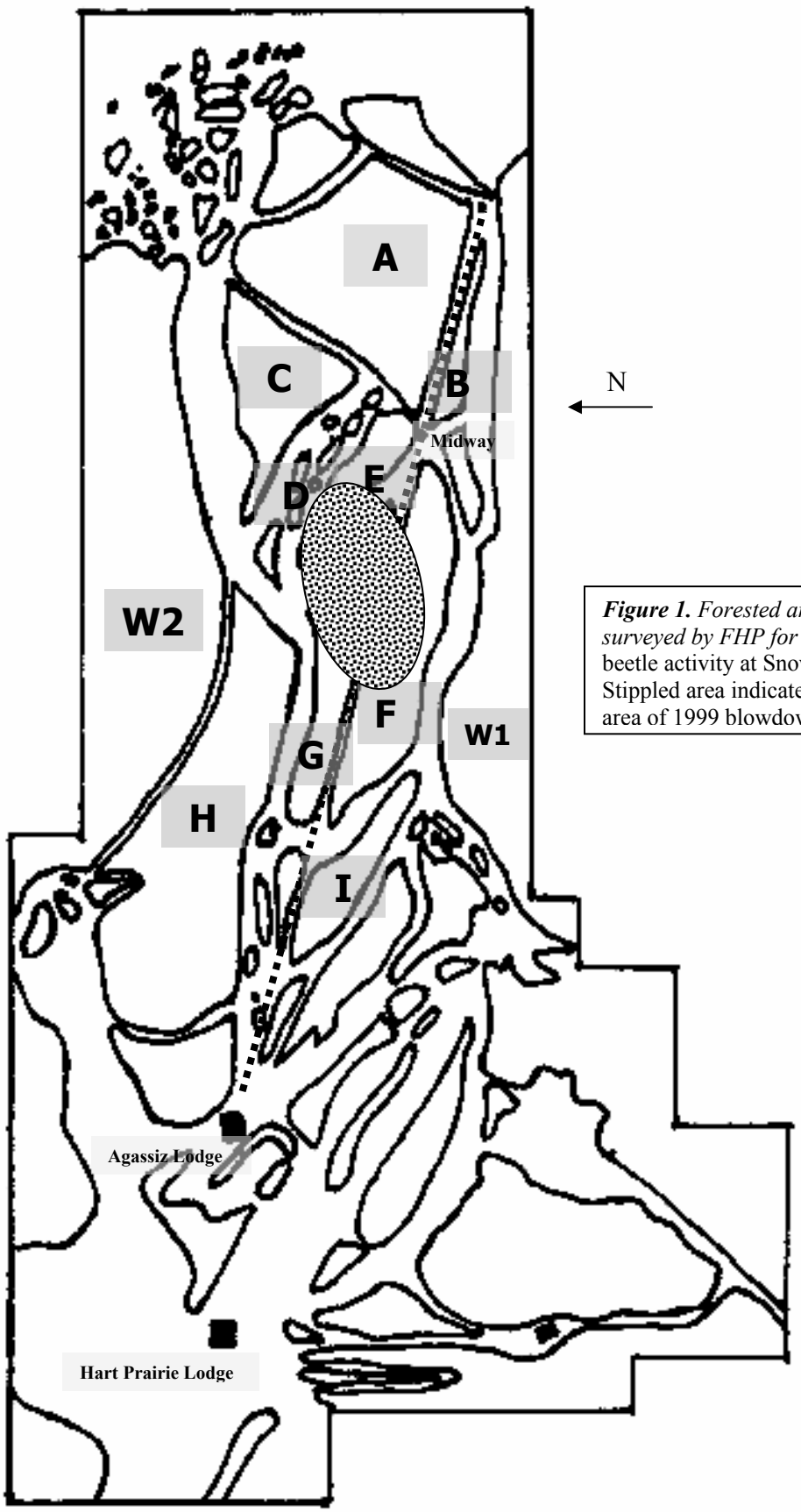

Figure 1. *Forested areas surveyed by FHP for spruce* beetle activity at Snowbowl. Stippled area indicates primary area of 1999 blowdown event.

Future situation and recommendations

Based on the reduced numbers of standing infested trees in areas surveyed, it appears that the integrated treatments have continued to contain and reduce the spruce beetle infestation. I recommend that one final treatment of MCH be implemented over all of the upper elevation forested islands in 2005 to prevent beetles from re-entering these stands. In addition, a late summer (September) survey for current infested trees throughout the spruce dominated stands should be conducted followed by felling and peeling treatment if necessary.

I recommend the same schedule be used in 2006:

1. MCH should be deployed in a grid fashion before the first of June. The CREC crew will assist in the stapling of MCH bubble capsules, as they have State of Arizona certified pest applicators and have experience using MCH. Our office will supervise handling and deployment of MCH. MCH should be ordered by March and received by the end of April.
2. Felling and peeling treatments should take place in September through October. The reasoning for this is that both fire danger restrictions (typically early June through early July) and weather delays (mid July through early September) can hamper treatments from efficiently being implemented during most of the summer.

Funds may be available for FY2006 from Forest Health Protection for suppressing spruce beetle populations at the Snowbowl Ski area. Requests for these funds should be in no later than October 15, 2006.

If you have any questions regarding my assessment of current bark beetle activities within the project area, its potential effect on residual standing trees, or my recommendations, please let me know. I can be reached at (928) 556-2074.

/s/ Joel D. Mcmillin
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Entomologist, Forest Health, Arizona Zone

cc:
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